DOCUMENT RESUME

ED 312 022 JC 890 532

AUTHOR Cullen, Audrey M.
TITLE Assessing Economic Impact of Community College Engineering Technology Graduates.
INSTITUTION Delgado Community Coll., New Orleans, LA.
PUB DATE 9 Oct 89
NOTE 52p.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS College Faculty; Community Colleges; Departments; *Economic Impact; Educational Economics; *Engineering Technicians; *Engineering Technology; Expenditures; Graduate Surveys; Place of Residence; Questionnaires; Salaries; *School Community Relationship; School Personnel; Student Characteristics; Two Year Colleges
IDENTIFIERS *Economic Impact Studies

ABSTRACT

A five-year follow-up was conducted of graduates of the Engineering Technology program at Delgado Community College to estimate the economic impact of the Engineering Technology Division, and its faculty, staff, and graduates on the Standard Metropolitan Statistical Area (SMSA) of Orleans, Jefferson, St. Tammany, St. Charles, St. Bernard, and St. John. Surveys were mailed to 310 individuals who graduated from the program between 1982 and 1986, requesting information on their current residence, whether their jobs were consistent with their college majors, their income and expenditures, and whether they continued their education. Study findings, based on usable responses from 73 graduates, included the following: (1) 30 graduates continued their education beyond the associate's degree, 7 completed a bachelor of science degree, 1 a master's degree, and 17 took some formal college credit courses; (2) 93% were still living in the SMSA at the time of the survey; (3) income levels ranged from less than $10,000 to more than $39,999 per year; (4) 53% of the respondents indicated that their current job matched their college major, while 39.7% reported no match; (5) for the 68 graduates living locally, housing costs, including utilities, were approximately $555 per month, while non-housing expenditures averaged $773.00 per month; and (6) extrapolating from the survey data, it was estimated that the approximately 290 program graduates who could be expected to live in the SMSA had total annual expenditures of $4,621,440. College payroll records revealed that between 1982 and 1986, faculty and staff earned a total of $2,725,818, with a disposable income of $436,131 per year. Operating expenses of the Division for items such as travel, printing, and supplies were approximately $10,295 per year. Estimated direct spending of the Division, its faculty, staff, and graduates was estimated at approximately $5,066,767 annually, while indirect spending was estimated at $10,143,534 per year. The survey instruments are appended. (AYC)

ED312022

Assessing Economic Impact of Community College Engineering Technology Graduates

Audrey M. Cullen

Delgado Community College

Running Head: ASSESSING ECONOMIC IMPACT

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

A. Cullen

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

JC890532

Abstract

A five year follow-up study of Engineering Technology graduates of Delgado Community College was designed and implemented for the purpose of determining one level of estimated economic impact of the Engineering Technology Division, its faculty and staff and its graduates in the Standard Metropolitan Statistical Area (SMSA) of Orleans, Jefferson, St. Tammany, St. Charles, St. Bernard, and St. John. In addition, this study attempts to determine what happens to Delgado Engineering graduates once they leave the College. Do they continue to live in the New Orleans SMSA? Do they work in fields consistent with their college majors? What is their income and what expenditures do they have? Have they continued their education? Engineering Technology graduates were surveyed via a written questionnaire to obtain information needed to calculate an estimate of direct and indirect economic effects of the Engineering Technology Division, its faculty and graduates for a five year period from 1982-1986. Another objective of this study was to provide a framework for obtaining information needed by the College for possible long range planning and decision-making.

Assessing Economic Impact of Community College Engineering Technology Graduates

The notion that education and lifetime income are correlated in a positive fashion has been explored in print at least since 1964 when Bowen wrote Economic Aspects of Education. Since then various studies have shown specific data indicating the lifetime worth of additional years of schooling. "Wealth of Knowledge," a study of California's higher education economic impact in the state, cites data from a 1982 National Center for Education Statistics report which indicates that men with less than eight years of schooling earned a lifetime income average of $279,997. Men with one to three years of college earned an average lifetime income of $543,435. With increased years of schooling lifetime earnings increased consistently beyond three years of college. More recent studies have highlighted the "even more important" intangible benefits of increased education. Individuals with higher education show lower rates of unemployment, greater adaptability to change, awareness of and involvement in social and civic responsibilities. For the business community and the state, benefits of education are reflected in the creation of new jobs, creation of new knowledge, training of highly skilled talent, increased taxes, and enrichment of cultural life. "The cumulative evidence leaves no doubt that American higher education is well worth what it costs," according to Bowen, (1976). In today's hightech world unskilled jobs are reportedly

becoming fewer and fewer and education has become a key factor for individuals aspiring to high income careers. In addition, higher education is a significant influence in the economic and social life of the over-all community. Because such beliefs prevail, researchers have increasingly tended toward more objective ways of assessing the value of education and educational institutions in a community.

The "expenditure multiplier" permits a specific measure of impact based on the economic principle of exchange, i.e., when money is spent for some purpose it does not simply disappear, but instead is spent over and over again, (Mckeown, M., 1986). The concept holds that a portion of the money spent in one geographic location may leave the area and the balance will remain in the community to be spent. Several transactions will take place before the value of the dollar originally spent drops below one cent. The cumulated transactions together generate more economic activity. A 50% "retention rate" yields an expenditure multiplier of 2.0--each dollar spent in that geographic area generates one additional dollar.

In 1980 Louisiana State University in Baton Rouge calculated that for every dollar expended by the Louisiana State system $.72 of additional income was generated in the state, for an expenditure multiplier of 1.72. Studies done in Maryland, California, North Carolina, and even in the rural south, show far-reaching effects of educational institutions on their communities. Such studies

repeatedly also note the impact of educational institutions on the community's quality of life as measured by personal and social growth factors. The relationship between education and economic, social and personal well-being in a community is valuable information. Because Louisiana is facing the worst economic hard times the state has ever seen and because Delgado Community College has not fully studied its role in the development of human and economic resources, this project proposes to do the first phase of an economic impact study of graduates of the Engineering Technology Division for the years 1982-86 inclusive.

Certain beliefs have prevailed in the press and in publications and reports from agencies such as the Chamber of Commerce and the Louisiana Association of Business and Industry detailing the lack of technically trained personnel in the state. Quality of work force is a prime concern of industry when considering the location of a new plant or business in any geographic area. Availability of well-trained workers reportedly was a major factor in the renewal of business activity in the northwestern United States several years ago where economic recovery was a remarkable phenomenon. Leaders in Louisiana have purportedly recognized the link between education and a thriving economy and have called for education reform. Educational institutions whose graduates contribute to a more viable economy and a higher quality of life would tend to become significant components of any proposed reforms. Delgado Community College, therefore, needs to know how its graduates

contribute to the economy of the greater New Orleans area--Orleans, Jefferson, St. Bernard, St. Tammany, St. Charles, and St. John. Delgado also needs to know if it is helping to train skilled technicians for job openings in this locale, or if trained technicians tend to relocate geographically. As a corollary, Delgado needs to know if engineering graduates become employed in their fields of training, or if they gravitate to other careers. And finally, what, if any, impact will graduates' demographic and economic information have on future planning of engineering education programs at Delgado?

Armchair philosophy tells us that Delgado's economic and social impact extends beyond its geographical location inasmuch as the local economy is strong on tourism and short on technical occupations. Heretofore, data from the graduate perspective have not been available for use in making long range educational decisions. Collection and analysis of data from this study may help provide the college with more concrete information with which to do educational planning, curricular reform, or may provide information useful in determining engineering technology education needs of the greater New Orleans area. Assessment of data from Engineering Technology graduates could provide a model for Delgado to use in determining a more complete picture of economic impact in the Standard Metropolitan Statistical Area as a result of having the college in the area.

Method

Subjects

Subjects were 310 graduates of the Engineering Technology Division of Delgado Community College for the years 1982-1986. Graduates were predominantly male. Thirty-six were female; 274 were male. Ages of the subjects ranged from over 20 to over 50 years of age.

Design and Procedure

An advisory council, composed of the current Engineering Division chairman, former Engineering chairmen, and representatives of the Engineering faculty, was convened to offer historical and technical assistance to the project. A member of the college business office and one outside consultant were also included as members of the council.

Methods developed by the American Council on Education (ACE) in "Estimating the Impact of a College or University on the Local Economy," (1971) were used as a basis for organizing data. A survey instrument pertaining to personal, historical and demographic information, income and career choice was designed for this research project. A copy of the questionnaire can be found in Appendix A. Formulae used to calculate data as extracted from the ACE report and interpolations are also shown in Appendix B.

The questionnaire was mailed to a population of 310 Engineering Technology graduates for the years 1982-1986. Postcards were mailed before and after the mailing of the questionnaire, notifying graduates of its impending arrival and subsequently, requesting its return. Copies of postcards are in Appendix A.

Results

Of the 310 questionnaires mailed to graduates, 89 were returned. Of that number, 73 were deemed usable, yielding N=73. Sixty-nine of those responding were male and four were female.

Table 1 shows the number of graduates surveyed in each graduating class, the number of usable questionnaires returned and the response

rate of each group. Data show declining numbers of students graduating with Engineering Technology degrees. Response rate improved with fewer graduates to survey and for the most recent years surveyed.

Table 1. Per cent of Returned Completed Questionnaires by Graduating Class Year.

Year	No. of Graduates Surveyed	Completed Questionnaires	Percent Returned
1982*	107	15	14.0%
1983*	87	8	9.2%
1984	46	18	39.1%
1985	43	14	32.6%
1986	27	18	66.7%
Totals	310	73	

*Total graduating class members were not surveyed for lack of mailing address information.

Results of the questionnaire

The questionnaire was designed to elicit educational, demographic, financial and educational/career relationship information from graduates.

Educational. Thirty Engineering Technology graduates out of 73 responding continued their education beyond the associate's degree. Table 2 shows that 7 completed the bachelor of science degree, one completed the master's degree (one had already had a master's degree prior to entering Delgado), 17 continued formal college credit courses, for a total of 41% pursuing some type of continuing education beyond the community college level.

Insert Table 2 about here

Quizzed as to whether or not they would have attended a college besides the community college that they had attended, 41% of the graduates said they would have attended some other institution of higher education. Sixty-one or 83% said they would not have gone to a college out-of-state. Results are shown in Table 3.

Insert Table 3 about here

Table 2. Number of Graduates Pursuing Education Beyond the Associates Degree

Community College Major	B.S.	B.A.	Master's	Ph.D.	Credit Courses No Degree	Non-Credit Courses
Architectural Engineering Tech.						
Civil Engineering Tech.					1	
Drafting	1				3	1
Electrical Engineering Tech.	2		1*		3	1
Electronic Services Tech.					5	
Fire Protection Tech.						2
Industrial Engineering Tech.	1					
Mechanical Engineering Tech.	2				2	
Petroleum Engineering Tech.	1		1		3	
Totals	7	0	2	0	17	4

*Master's achieved prior to Associate's Degree.

Table 3. Graduates Projections of Possible College Attendance Other Than Delgado.

Community College Major	None	UNO	SOUTHERN	LOYOLA	TULANE	OTHER	Out-of-State Yes	Out-of-State No
Architectural Eng. Tech.								
Civil Eng. Tech.		2						2
Drafting	4	4			2			10
Electrical Eng. Tech.	6	7	1	1		3	2	15
Electronic Services Tech.	6	9	3			3	5	17
Fire Protection Tech.	5	1				1	2	5
Industrial Eng. Tech.						1	1	
Mechanical Eng. Tech.		2	1				1	2
Petroleum Eng. Tech.	4	5	1				1	9
Other						1		1
Totals	25	30	6	1	2	9	12	61

Demographics. Data in Table 4 show that more males than females graduated with Engineering technology degrees for the years 1982-1986: 69 were male, 4 female. Although five graduates reported their ages as between 50 and 59, most graduates were between the ages of 20 and 39 and 9 were between 40 and 49. The racial make-up of those returning completed questionnaires was: Caucasian 47, Black 12, Hispanic 8, Asian 3, and 3 were categorized as "other" since no choice was given. Respondents indicated that they live in the greater New Orleans SMSA for the most part. Twenty-seven live in Orleans Parish, 26 in Jefferson and 15 live in St. Tammany, St. Charles, St. Bernard, and St. John combined. Five graduates reported living outside the New Orleans area. A total of 93% of graduates continue to live in the New Orleans geographic area. Of those who live out-of-state, two live in Texas, one in California. Two other graduates live in Louisiana beyond the New Orleans SMSA area. Table 4 shows demographic data by graduating class year.

Insert Table 4 about here

Income. Income levels of subjects ranged from less than $10,000 to $40,000 or more. Table 5 shows levels by major and by year graduated. All totaled, 14 people reported incomes of less than $10,000, 7 reported incomes of between $10,000 and $14,999, 7 said their incomes were between $15,000 and $15,999, five were receiving incomes between $16,000 and $19,999, 21 reported incomes of $20,000 to $29,999, and 10 reported incomes at $30,000 to $39,999. Nine reported incomes of $40,000 or more. Figure 1 shows the distribution of income levels across all the graduating years surveyed.

Table 4. Demographic Data for N=73, Graduates of Engineering Technology from 1982-1986.

Graduating Class Year	Sex		Age				Race					Place of Residence							
	M	F	20-29	30-39	40-49	50 & over	Caucasian	Black	Hispanic	Asian	Other	Orleans	Jefferson	St. Tammany	St. Charles	St. John	St. Bernard	Other	Out-of-state
1982	15	0	4	9	2	0	10	1	3	1	0	4	8	0	1	1	0	0	1
1983	8	0	4	3	0	1	6	1	0	1	0	2	3	2	0	0	1	0	0
1984	16	2	8	7	2	1	13	3	1	0	1	7	6	1	0	0	1	1	2
1985	12	2	5	6	1	2	9	2	3	0	0	6	4	0	1	0	2	1	0
1986	18	0	6	7	4	1	9	5	1	1	2	8	5	1	1	1	2	0	0
Totals	69	4	27	32	9	5	47	12	8	3	3	27	26	4	3	2	6	2	3

Insert Table 5 about here

Insert Figure 1 about here

Table 6 shows income by race and sex. Over 60% of all graduates earn about $16,000 per year and 12% earn $40,000 or more. Twenty-nine percent earn between $20,000 and $29,999. Only 12 Blacks, 8 Hispanics, 3 Asians, and 4 women (one Hispanic) returned completed questionnaires, not enough to observe trends for these groups.

Insert Table 6 about here

Educational/Career Relationship. Graduates were asked to determine if their college major matched their present job on a scale of one to five, labeled, "Strongly Agree," "Agree," "No Opinion," "Disagree," "Strongly Disagree." Table 7 shows the number of graduates agreeing or disagreeing that their college major matches their current job.

Insert Table 7 about here

Figure 2 shows the percentage of agreement or disagreement in each

Table 5_a. Income by Engineering Technology Major and by Year Graduated for N=73

	Less Than $10,000	$10,000-14,999	$15,000-15,999	$16,000-19,999	$20,000-29,000	$30,000-39,999	$40,000 & above
1982							
Drafting					2		
Electrical Eng. Tech.	2				1	1	2
Electronics Serv. Tech.	1				2		1
Petroleum Tech.		1				1	
Other	1						
Totals	4	1	0	0	5	2	3
1983							
Electrical Eng. Tech.	1		1		1		
Electronics Serv. Tech.			1	1		1	
Fire Protection					1		
Mechanical Eng. Tech.	1						
Totals	2	0	2	1	2	1	0

Table 5b. Income by Engineering Technology Major and by Year Graduated for N=73.

	Less Than $10,000	$10,000-14,999	$15,000-15,999	$16,000-19,999	$20,000-29,999	$30,000-39,999	$40,000 & above
1984							
Civil Eng. Tech.					1		
Drafting			1				
Electrical Eng. Tech.	1					1	
Electronic Serv. Tech.	2				2		1
Fire Protection					1	1	
Industrial Eng. Tech.					1		
Petroleum Eng. Tech.			1		3		2
Totals	3	0	2	0	8	2	3

Table 5c. Income by Engineering Technology Major and by Year Graduated for N=73.

	Less Than $10,000	$10,000-14,999	$15,000-15,999	$16,000-19,999	$20,000-29,999	$30,000-39,999	$40,000 & above
1985							
Drafting*	1	1	1	1			
Electrical Eng. Tech.					1	2	
Electronics Serv. Tech.		1	1		1		
Fire Protection					1		
Mechnaical Eng. Tech.				1			
Petroleum Eng. Tech.							1
Totals	1	2	2	2	3	2	1

*One Drafting major did not supply income data.

Table 5d. Income by Engineering Technology Major and by Year Graduated for N=73.

	Less Than $10,000	$10,000-14,999	$15,000-15,999	$16,000-19,999	$20,000-29,999	$30,000-39,999	$40,000 & above
1986							
Civil Eng. Tech.				1			
Drafting	1		1				
Electrical Eng. Tech.	1	2		1		2	
Electronics Serv. Tech.	2	1			1	1	
Fire Protection					1		2
Mechnical Eng. Tech.		1					
Petroleum Eng.Tech.					1		
Totals	4	4	1	2	3	3	2

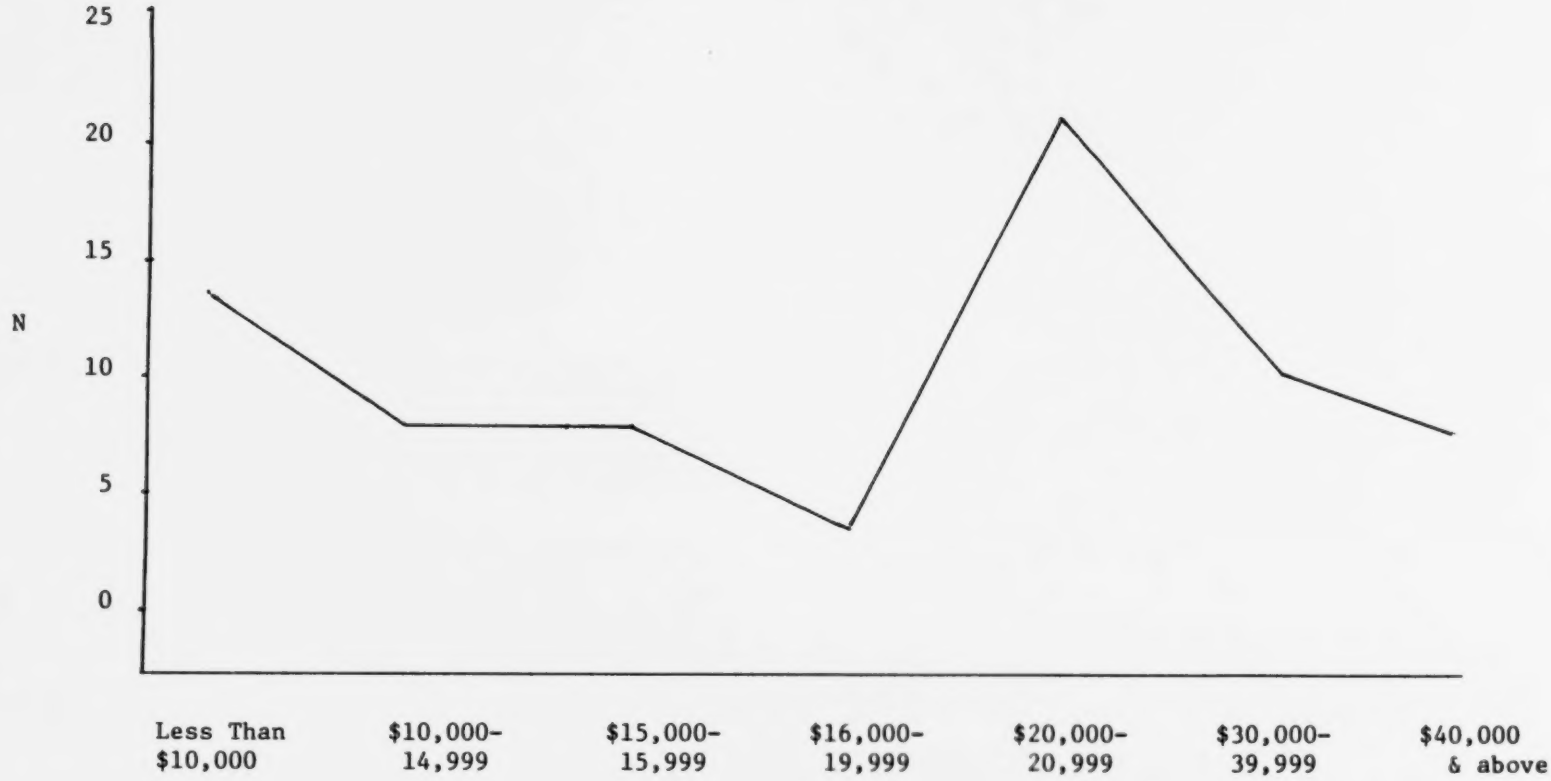

Fig. 1. Income ranges reported by 73 Engineering Technology graduates, 1982-1986 with the Associate of Science degree.

Table 6. Income Ranges by Race and Sex for Engineering Technology Graduates, n=73.

	Caucasian		Black		Hispanic		Asian		Other	
	M	F	M	F	M	F	M	F	M	F
Not Reported		1								
Less than $10,000	5		5		2	1			1	
$10,000-$14,999	5		2							
$15,000-$15,999	4				1		2			
$16,000-$19,999	3		2							
$20,000-$29,999	13	1	3		2				2	
$30,000-$39,999	6				1		1			
$40,000 and above	8	1			1					
Totals	44	3	12		7	1	3		3	

Table 7. Engineering Technology Graduates Indicating that College Major Matches Current Job; N=73.

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
1982	1	5	2	2	5
1983	2	3	1	0	2
1984	5	6	0	4	3
1985	1	4	2	5	2
1986	4	8	0	2	4
Totals	13	26	5	13	16

category, plus the combined effect of "Strongly Agree/Agree," and "Disagree/Strongly Disagree." Combined data seem to yield a bimodal effect with 53% reporting a match and 39.7% indicating that there is no match between college major and current job. Only a few subjects (5) had no opinion.

Insert Figure 2 about here

Direct Spending

Graduates. Graduates' estimates of their average monthly spending on items such as housing, utilities, food, clothing, entertainment, transportation, personal and health care, furniture, and miscellaneous items are shown in Table 8. These data were used to estimate the effects of graduate spending in the greater New Orleans geographic area.

Insert Table 8 about here

Data show that for 68 graduates residing locally, housing costs, including utilities, are approximately $555.00 per month per graduate, totalling $37,739. Using data collected in this survey to estimate the

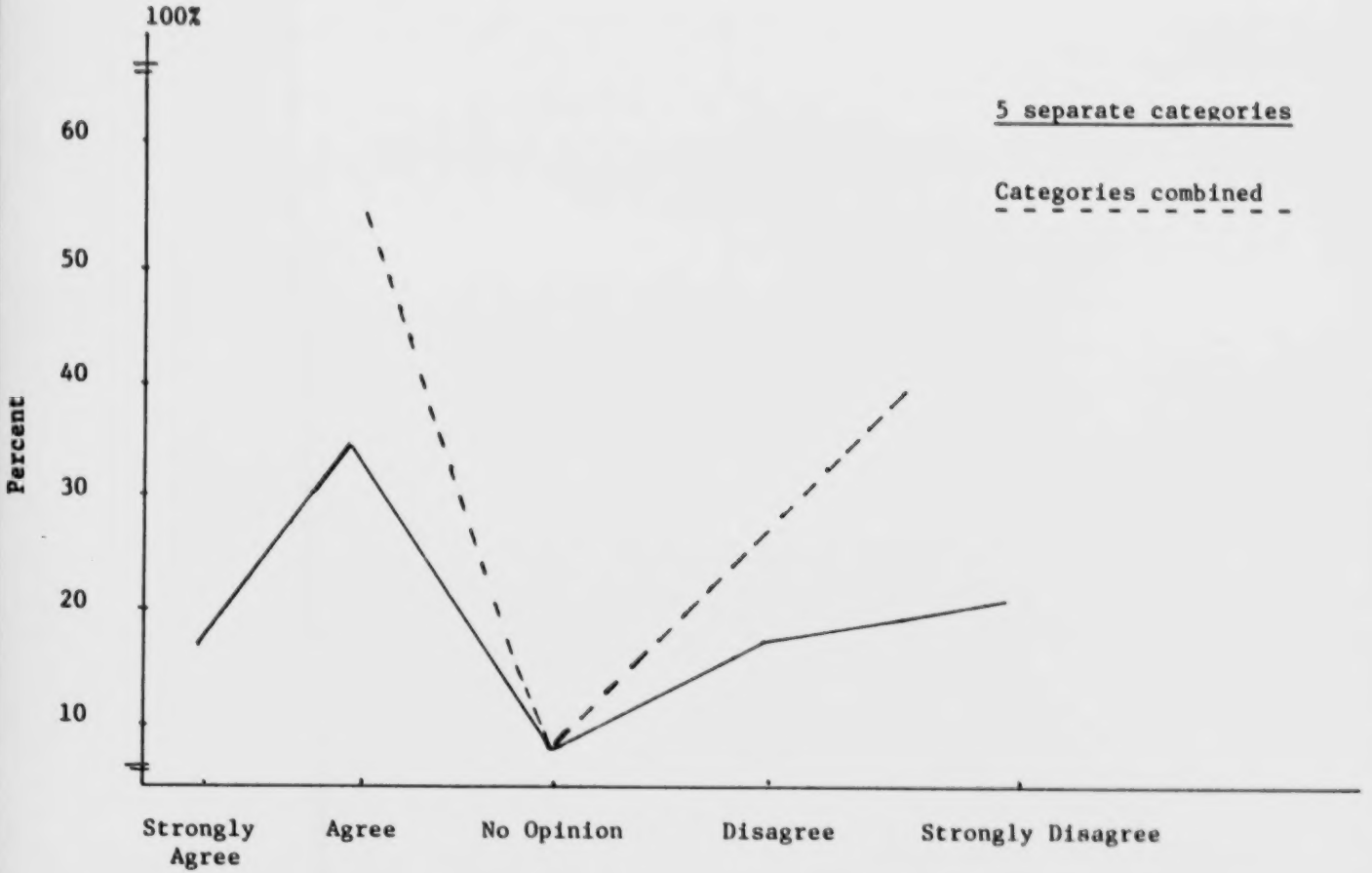

Fig. 2. Graphic representation of Engineering Technology graduates perceptions of agreement between college major and current job.

Table 8. Graduates' Estimates of their Average Monthly Spending. Out-of-state Graduates' Spending Is Subtracted from Total.

RENT	UTILITIES	FOOD HOME	FOOD OUT	ENTERTAINMENT	TRANSPORTATION: AUTO	PUBLIC	CLOTHING	PERSONAL	HEALTH	SMALL PURCHASES	OTHER
500.00	160.00	350.00	75.00	20.00	150.00	0.00	50.00	20.00	50.00	100.00	325.00
100.00	75.00	100.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	0.00	0.00
1100.00	300.00	400.00	100.00	100.00	210.00	0.00	60.00	40.00	100.00	0.00	0.00
320.00	200.00	200.00	100.00	50.00	600.00	0.00	75.00	50.00	150.00	50.00	150.00
100.00	200.00	200.00	200.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	200.00
475.00	80.00	130.00	200.00	150.00	400.00	0.00	100.00	100.00	100.00	50.00	0.00
576.00	150.00	200.00	20.00	20.00	150.00	0.00	25.00	200.00	0.00	0.00	0.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
370.00	120.00	100.00	100.00	50.00	50.00	0.00	50.00	25.00	50.00	70.00	0.00
150.00	150.00	250.00	50.00	0.00	250.00	0.00	50.00	0.00	100.00	0.00	0.00
300.00	75.00	200.00	50.00	50.00	20.00	0.00	75.00	20.00	50.00	0.00	0.00
250.00	150.00	250.00	50.00	25.00	300.00	0.00	50.00	25.00	150.00	10.00	0.00
400.00	150.00	300.00	150.00	0.00	400.00	0.00	50.00	50.00	50.00	0.00	0.00
250.00	50.00	150.00	20.00	50.00	100.00	0.00	50.00	0.00	50.00	50.00	0.00
285.00	69.00	150.00	0.00	0.00	0.00	21.00	0.00	10.00	24.00	0.00	150.00
250.00	250.00	450.00	0.00	0.00	350.00	0.00	0.00	0.00	50.00	0.00	0.00
700.00	175.00	250.00	75.00	40.00	150.00	0.00	50.00	25.00	125.00	40.00	65.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
750.00	125.00	250.00	150.00	150.00	250.00	0.00	100.00	50.00	250.00	0.00	0.00
0.00	0.00	50.00	50.00	150.00	85.00	0.00	15.00	0.00	50.00	0.00	0.00
800.00	150.00	250.00	150.00	50.00	750.00	0.00	0.00	0.00	50.00	0.00	0.00
500.00	200.00	200.00	100.00	50.00	500.00	0.00	50.00	25.00	200.00	100.00	0.00
0.00	0.00	50.00	20.00	10.00	60.00	0.00	40.00	20.00	0.00	0.00	0.00
100.00	100.00	75.00	110.00	250.00	550.00	21.00	200.00	75.00	50.00	0.00	0.00
400.00	150.00	200.00	75.00	50.00	100.00	0.00	50.00	50.00	25.00	25.00	0.00
100.00	0.00	20.00	150.00	120.00	50.00	0.00	50.00	0.00	0.00	20.00	0.00
525.00	225.00	450.00	50.00	0.00	400.00	0.00	100.00	25.00	50.00	0.00	0.00
1100.00	400.00	500.00	400.00	200.00	600.00	0.00	500.00	100.00	200.00	100.00	0.00
500.00	300.00	200.00	100.00	100.00	50.00	0.00	100.00	100.00	0.00	0.00	0.00
400.00	200.00	200.00	100.00	25.00	100.00	0.00	25.00	50.00	0.00	100.00	0.00
200.00	150.00	200.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
650.00	150.00	200.00	200.00	50.00	400.00	0.00	50.00	25.00	50.00	200.00	0.00
725.00	225.00	300.00	75.00	100.00	500.00	0.00	50.00	75.00	100.00	0.00	225.00
370.00	150.00	120.00	40.00	30.00	120.00	0.00	20.00	25.00	34.00	10.00	50.00
250.00	150.00	200.00	200.00	300.00	40.00	0.00	20.00	15.00	0.00	0.00	0.00
150.00	100.00	200.00	50.00	50.00	150.00	0.00	0.00	10.00	72.00	0.00	600.00
600.00	175.00	200.00	100.00	100.00	150.00	0.00	50.00	0.00	40.00	80.00	0.00
537.00	185.00	320.00	20.00	20.00	535.00	0.00	35.00	25.00	150.00	0.00	170.00
0.00	0.00	0.00	10.00	70.00	45.00	0.00	10.00	0.00	35.00	37.00	0.00
0.00	0.00	0.00	25.00	15.00	100.00	0.00	50.00	0.00	0.00	0.00	0.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
500.00	150.00	200.00	100.00	25.00	300.00	0.00	50.00	100.00	30.00	200.00	0.00
965.00	350.00	400.00	80.00	25.00	200.00	0.00	50.00	200.00	0.00	250.00	0.00
120.00	0.00	100.00	0.00	0.00	0.00	14.00	0.00	0.00	20.00	0.00	0.00
550.00	100.00	100.00	100.00	50.00	175.00	0.00	25.00	25.00	25.00	100.00	0.00
475.00	80.00	100.00	100.00	50.00	450.00	0.00	30.00	60.00	25.00	50.00	0.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
350.00	100.00	0.00	50.00	50.00	30.00	0.00	25.00	0.00	20.00	0.00	475.00
200.00	0.00	0.00	150.00	175.00	200.00	15.00	60.00	15.00	50.00	25.00	0.00

Out-of-state Graduates' Spending. Data Are Not Included in Local Spending Effects.

Rent	Util.	Food HOme	Food Out	Entertain-ment	Auto	Public Trans.	Cloth.	Pers.	Health	Small Purch.	Other
$ 622.00	$250.00	$300.00	$ 25.00	$25.00	$600.00	-	$50.00	$15.00	$60.00	$30.00	-
200.00	80.00	100.00	50.00	50.00	250.00	-	20.00	5.00	25.00	20.00	-
687.00	150.00	300.00	50.00	15.00	150.00	-	-	25.00	140.00	100.00	-
275.00	90.00	200.00	25.00	-	208.00	-	10.00	-	30.00	50.00	15.00
1,000.00	100.00	120.00	140.00	-	210.00	-	100.00	50.00	-	-	-

Totals for 73 Graduates Surveyed with Figures from 5 Graduates Outside the SMSA Removed

Rent	Util.	Food Home	Food Out	Entertain-ment	Auto	Public Trans.	Cloth.	Pers.	Health	Small Purch.	Other
$30,709	$10,484	$14,885	$5,815	$3,690.	$16,358	$84.00	$3,895.	$2,435.	$3,836.	$2,379.	$2,740.
2,784	670	1,020	290	90	1,418	-	180	95	255	200	15
$27,925	$ 9,814	$13,865	$5,525	$3,600	$14,940	$84.00	$3,715	$2,340	$3,581	$2,179	$2,725

Averages of Spending Categories for 68 Graduates Living Within the SMSA

Rent & Util.	Food Home	Food Out	Enter.	Auto	Public Trans.	Cloth.	Pers.	Health	Small Purch.	Other
$ 554.98	$203.90	$81.25	$54.24	$219.71	$1.24	$54.63	$34.41	$52.66	$32.04	$40.07

number of graduates who would likely reside outside the New Orleans SMSA, calculations are that for 310 graduates, one could expect that 20 graduates would reside outside the area. Extrapolating from this, results are that annual housing costs, including utilities, for 290 graduates (310 - 20) are $1,931,400 ($555.00 x 12 = $6,660 x 290).

Graduate nonhousing spending totaled $52,554 monthly, or approximately $773.00 per month per graduate. Again extrapolating from these data, estimates of annual nonhousing spending for 290 graduates are $2,690,040 ($773.00 x 12 = $9,276 x 290).

Total annual housing and nonhousing spending for 290 graduates is estimated at $4,621,440.

Faculty and Staff. Faculty and staff were not surveyed, therefore, college records were used to obtain salary information. Faculty and staff salaries for the five years 1982-1986 inclusive were $2,725,818 for an average of $545,164 per year. Approximately 22 faculty members and one staff person were involved.

Disposable income, according to the ACE report, can be estimated at 80% of gross income. Faculty and staff disposable income for this report then is calculated at $436,131 ($545,164 x .80 = $436,131). These data do not reflect consideration of savings as opposed to spending.

Using proportions yielded by the ACE report, faculty and staff housing expenditures are estimated at $139,562 annually ($436,131 x .32). Nonhousing expenditures are estimated at $274,763 annually ($436,131 x .63). Total housing and nonhousing estimates for disposable income at 80% of

gross income is $414,325, for faculty and staff. Because faculty and staff were not surveyed directly, a comparison figure of 70% was also calculated as disposable income. At the 70% level, disposable income is estimated at $381,615, annually ($545,164 x .70). Housing costs at the 70% level then are estimated at $122,117 ($381,615 x .32). Nonhousing costs are estimated at $240,417 ($381,615 x .63). Using the more conservative estimate of disposable income, total direct spending is estimated at $362,534 annually for faculty and staff.

Engineering Technology Division. Expenditures made by the college from 1982 through 1986 for operating the Engineering Technology Division are shown in Table 9. Expenditures included travel, printing, supplies, rentals, and maintenance which were categorized as operating expenses. Table 9 also shows capital outlay expenditures and faculty and staff salaries.

Insert Table 9 about here

Over the five year period of time being studied, the Engineering Technology Division spent an average of approximately $597,901 per year; $545,164, was accounted for by salaries. Operating expenses averaged $10,295, per year. The five year capital outlay expenditures averaged $42,443, annually. Of these amounts, conservative estimates are that

Table 9. Engineering Technology Division expenditures for 1982-1986, exclusive of salaries for faculty and staff

Year	Travel	Operating Services	Supplies	Sub-total Opr. Exp.	Capital Outlay	Total
1982	$ 88.20	$6,351.18	$11,141.63	$17,581.01	$12,745.50	$30,326.51
1983	202.02	446.50	7,262.45	7,910.97	129,090.10	137,001.97
1984	370.84	996.12	8,338.50	9,705.46	852.00	10,557.46
1985	44.00	448/05	9,145.94	9,637.99	61,065.80	70,703.79
1986	630.03	247.00	5,773.31	6,650.34	8,586.54	15,236.88
Totals	$1,335.09	$8,488.85	$41,661.83	$51,485.71	$212,339.94	$263,826.61

95% of operating expenses and 50% of capital outlay funds are spent locally, yielding totals of $9,780 and $21,222 annual expenditures in the community as a result of the college being located there. These totals together, excluding salaries, equal $31,002.

Estimated direct spending of the Engineering Technology Division, its faculty and staff and graduates is approximately $5,066,767 annually. Table 10shows these results. Because students presently enrolled in the college were not surveyed for their spending impact on the local economy, the $5,066,767 figures is a conservative estimate of direct spending generated by the college.

Indirect Spending

Indirect spending can be estimated as a result of the multiplier effect. The concept of the multiplier is that for each dollar spent a certain proportion of the dollar will remain in the local community where it is originally spent. The remaining proportion will be spent on goods and services outside the community. The portion which stays in the community will be re-spent over and over again until the amount to be re-spent is less than one cent. The ratio of re-spending of the original one dollar is called the multiplier because of the number of times that the dollar is turned over. Because of its metropolitan make-up and because of the geographic setting of the greater New Orleans area, the assumption is that there is a tendency for the dollar spent locally to remain in the community longer than in other communities. Using a conservative estimate of 2 (50% retention rate), indirect spending by

Table 10. Estimated Direct Spending of the Engineering Technology Division, Faculty and Staff and Graduates

	Housing	Nonhousing	Totals
Graduate	$1,931,400	$2,690,040	$4,621,440
Faculty & Staff	139,562	274,763	414,325
Totals	$2,070,962	$2,964,803	$5,035,765

Engineering Technology Division Direct Spending in the Local Community

Capital Outlay	$21,222		
Operating Expenses	9,780		
Total	$ 31,002		31,002
		Grand Total	$5,066,767

the Engineering Technology Division is estimated at $62,004; indirect spending by graduates is estimated at $9,242,880; for faculty and staff indirect spending is estimated at $828,650 for a total of $10,143,534. These data show that of the dollars spent on the Engineering Technology Division, the amount returned to the private sector is considerably more than the original amount invested by the state. See Table 11.

Discussion

Information gleaned from graduates in this study indicated that 41% continued their education beyond the associate's degree. Seven graduates, or 9.5%, received the bachelor of science degree and one achieved the master's degree. A total of amost 11% obtained formal academic degrees after leaving Delgado. Considering that the bachelor of engineering technology degree is not readily available in the New Orleans geographic area, 11% is an impressive figure. To achieve the B.S. degree graduates would have been able to transfer only about one-third of their engineering courses from Delgado to a senior college or university which did not offer a program in engineering technology. Most graduates (17) continued their education by taking advanced credit courses. Some graduates enrolled in non-credit courses of one variety or another. Two graduates indicated they were pursuing the bachelor's degree at the time of the survey.

Since Delgado is a community college, the researcher wanted to know if graduates would have gone to school anywhere else in the state besides Delgado, or if they would have gone to school out-of-state. Twenty-five,

or 34%, said they would not have gone to any other institution of higher learning if they had not attended Delgado. Thirty, or 41%, said they would have attended the University of New Orleans, 8% said they would have attended Southern University, and 16% gave indication they would have chosen some other college. Overwhelmingly, 61 graduates, or 83.5%, said they would not have gone to school out-of-state. These data strongly suggest that the community college is serving the educational demands of those seeking engineering technology degrees.

One of the major interests in this study was determination of residency of graduates. Because the greater New Orleans area is not a heavily high tech or manufacturing area, one might expect that graduates of Engineering Technology programs would tend to gravitate to other geographic locations more favorable to their occupational pursuits. According to data compiled in this study, graduates of Delgado Community College tend to stay in the New Orleans area in large numbers and may change careers rather than move. This tendency might be in keeping with local legend which says that people living in New Orleans tend not to be as mobile as people in other geographic locations. It is also noteworthy that some graduates showed no expenses for housing costs, perhaps indicating that some graduates still live at home with parents.

Sixty-eight of 73 graduates, or 93%, continue to live in the New Orleans SMSA. Only 3 live out-of-state and two live outside the SMSA within Louisiana.

As one might expect, more white males graduated with Engineering

Technology degrees than did either women in general or Blacks and other minorities. Graduates' ages fell largely between 20 and 39, somewhat typical of recent graduates from other community colleges. Higher age level may be accounted for by the fact that community college students tend toward being "stop outs" or "reverse transfers," that is, they either do not go to college immediately following high school graduation or they attend a four year college or university first, drop out, and later return to the community college.

Because graduates answered the question about college major and career match to reflect strongly opposing opinions--49 agreed and 29 disagreed that there was a match between major and career--this question seems to warrant further investigation. One consideration is that graduates did not want to leave the geographic area and could not find work in their field of choice. Another possibility, of course is that career change was a matter of personal preference. The topic of satisfaction with career choice and satisfaction with the college should be explored to enlighten those interested in this phenomenon.

Graduates spending patterns in the greater New Orleans area showed that housing costs were higher than any other item as reflected in Table 8. Somewhat surprisingly, automobile costs exceeded costs for food. However, food costs at home and "out," taken together, do exceed those of automobile expenses. In reviewing the data, one also might want to consider whether the survey question in relation to entertainment and in relation to food could have been defined more accurately in a city

such as New Orleans, a city which emphasizes its fine restaurants and fine cooking.

Over-all, significant economic impact results seem evident in relation to Delgado's Engineering Technology Division. Data seem to warrant a broader study of the entire college's economic impact in the greater New Orleans area. Dollars invested by the state on behalf of the Delgado Engineering Technology Division were returned in the form of business activity in the private sector by more than tenfold. No attempt was made to assess economic impact in reference to payment of taxes to local or state governments, nor to assess the effects on individuals, for example, in relation to the number of jobs created by the existence of the Engineering Technology Division. Because many factors were not considered due to limitations of time, money and effort, results obtained were extremely conservative in nature.

Summary

Total spending effects of the Engineering Technology Division, its faculty and staff, and its recent graduates was estimated at $6,017,144. Graduates of the Engineering Technology Division tend to stay in the greater New Orleans area and some gravitate to jobs outside their educational background. Housing and transportation markets were most affected by graduates' spending habits. More in-depth research for the entire college rather than along divisional or discipline lines was suggested to determine more fully what the total economic impact of Delgado Community College may be in the greater New Orleans area.

References

Boward, H., Clecak, P., Dowd, J. P., & Douglass, G. K. (1977). Investment in learning: the individual and social value of American higher education. (A report issued by the Carnegie Council on Policy Studies in Higher Education). San Francisco: Jossey-Bass.

Bowen, W. G. (1964). Economic aspects of education. (Industrial Relations Section, Research Series No. 104). Princeton: Princeton University Press.

Caffrey, J. & Isaacs, H. H. (1971). Estimating the impact of a college or university on the local economy. Washington, D.C. American Council on Education.

Hackney, S. (1986). The university and its community: past and present. The Annals, 488, 135-147.

Kincaid, C. & Tippett, C. (1984). Spending patterns and the Caldwell county economy: an economic impact study. Caldwell Community College and Technical Institute. Office of Research and Planning. LeNoir, N.C.

McKeon, M. (1987). Higher education's monetary and nonmonetary impact on Maryland's economy. Postsecondary Education Reports, Annapolis: Maryland State Board for Higher Education.

Wealth of Knowledge: Higher education's impact on California's economy. (Commission report No. 84-1). California State Postsecondary Education Commission. (1984). Sacramento.

Appendix A

QUESTIONNAIRE

The Engineering & Technology Division of Delgado Community College is doing a follow-up study of its graduates. We want to determine the economic impact created in the greater New Orleans area by having engineering technology education available to our citizens. The school budget, i.e., spending for the Engineering & Technology Division, plus spending patterns of graduates contribute to the over-all economic impact in the greater New Orleans area (Orleans, Jefferson, St. Tammany, St. Bernard, St. John, and St. Charles Parishes).

Would you please help us to develop this information by providing the following information: PLEASE DO NOT SIGN YOUR NAME.

1. What was your major at Delgado? PLEASE CHECK ONE.

   ___ARCHITECTURE ___CIVIL ENGINEERING ___DRAFTING (Engineering Graphics)

   ___ELECTRICAL ENGINEERING ___ELECTRONICS SERVICING ___FIRE PROTECTION

   ___INDUSTRIAL ENGINEERING ___MECHANICAL ENGINEERING ___PETROLEUM ENGINEERING

   ___OTHER. If other, which one _____

2. When did you graduate? _____
   Month/Year

3. After you graduated from Delgado, did you continue your education by taking courses with another college or university?

   ___YES

   ___NO. (If NO, GO TO QUESTION NUMBER 6)

4. If YES, did you receive a higher degree? PLEASE CHECK ONE.

   ___B.S. ___B.A. ___Master's ___Ph.D. ___NONE.

5. If NONE, how many semester hours did you achieve? _____

6. If you had not attended Delgado Community College would you have attended another local college?

   ___YES

   ___NO (If NO, GO TO QUESTION NUMBER 8)

7. If YES, which one: ___UNO ___SOUTHERN ___LOYOLA ___TULANE ___OTHER
   If OTHER, Please name which one. _____

8. If NO, would you have attended a college outside the New Orleans metropolitan area?

   ___YES (If YES, GO TO QUESTION NUMBER 9)

   ___NO (If NO, GO TO QUESTION NUMBER 10)

9. If YES, which one? _____

10. What is your sex? PLEASE CHECK ONE.

___M

___F

11. What is your age? PLEASE CHECK ONE.

_____20 - 29

____ 30 - 39

____ 40 - 49

____ 50-- 59

____60 and over

12. What is your race? PLEASE CHECK ONE.

____Caucasian ___Black ___Hispanic ___Asian ___Other.

13. In which state are you now living?

_____

14. If Louisiana, please indicate which parish.

___ORLEANS ___JEFFERSON ___ST. TAMMANY ___ST. BERNARD ___ST. CHARLES

___ST. JOHN _____OTHER

15. What was your income from your job in 1987?

a.____less than $10,000

b.____$10,000 - 14,999

c.____$15,000 - 15,999

d.____$16,000 - 19,999

e.____$20,000 - 29,999

f.____$30,000 - 39,999

g.____$40,000 and above

16. Your current job matches the degree you received at Delgado Community College. CHECK ONE.

17. ____Strongly agree

18.____Agree

19.____No opinion

20.____Disagree

21.____Strongly disagree

22. What is your current job title:

_____

23. List other jobs you have had since leaving Delgado, including dates. PLEASE LIST THE LAST JOB FIRST.

JOB TITLE	DATES	CITY & STATE WHERE LOCATED

24. Please ESTIMATE your average MONTHLY spending in each of the areas shown below. If you do not spend any money on a particular item, write zero in that blank.

		AMOUNT
a.	Rent or house payment	$_____
b.	Utilities (gas, water, phone, electricity)	_____
c.	Food expenditures at home	_____
d.	Eating out (restaurants, fast foods)	_____
e.	Entertainment (movies, sports, etc.)	_____
f.	Automobile (payments, repairs, gas, insurance)	_____
g.	Other transportation (public transportation)	_____
h.	Clothing	_____
i.	Personal service (dry cleaning, hair care, day care, etc.)	_____
j.	Health services (including hospitalization costs, & insurance)	_____
k.	Furniture & appliance purchases (for monthly costs, divide 12 into total spent for last 12 months)	_____
l.	Other, please specify	
	_____	_____
	TOTAL	_____

Thank you for helping us.

Postcard sent to 310 graduates prior to sending the questionnaire:

Vice President of Student Affairs
Delgado Community College
501 City Park Avenue
New Orleans, LA 70119-4399

Non Profit
Organization
U.S. Postage Paid
New Orleans La.
Permit no. 522

DELGADO COMMUNITY COLLEGE is conducting a study to determine the economic impact of Engineering Technology graduates in the greater New Orleans area. A questionnaire will be mailed to you, a Delgado Engineering graduate, in the near future. Please be on the lookout for it. Your answers will help us to learn more about education in New Orleans and its effects on our economy.

Audrey Cullen, Counselor

Postcard sent to 310 graduates subsequent to mailling the questionnaire:

Vice President of Student Affairs
Delgado Community College
501 City Park Avenue
New Orleans, LA 70119-4399

Non Profit
Organization
U.S. Postage Paid
New Orleans La.
Permit no. 522

Last week you received a questionnaire which will be used in a follow-up study of Engineering Technology graduates and their economic effects on the greater N.O. community. If you have already completed and returned it to us, we appreciate your help in determining the effects of Community College education in our area.

If you have not yet returned the questionnaire, please complete and return it today. If you have any questions or if we can help you in some way, please call Audrey Cullen at 483-4440.

Sincerely,

Appendix B

Source: American Council on Education, 1971

Model B-1 BV_{CR} College Related Local Business Volume

$$BV_{CR} = (E_L)_{CR} + (P_{LB})_{CR} + (BV_I)_{CR}$$

Model B-1.1 $(E_L)_{CR}$ College Related Local Expenditures

$$= (E_L)_C + (E_L)_F + (E_L)_S + (E_L)_V$$

Derived: $(E_L)_{ER}$ Engineering Technology Division Related Local Expenditures

Derived: $(E_L)_{ER} = (E_L)_E + (E_L)_F + (E_L)_{Grad}$

$(E_L)_V$ is a visitor factor and is not applicable to this study and is not being considered. Since expenditures of the Engineering Technology Division only are considered here, the factors as defined by Caffrey and Issacs in the American Council on Education study have been changed to reflect this.

Model B-1.1.1 $(E_L)_C$ Local Expenditures by the College

$$(E_L)_C = (e_L)_C \ (E_C - W_{F,S} - XF_C - R_C)$$

Derived: $(E_L)_E = (e_L)_E \ (E_E - W_{F,Grad})$

Model b-1.1.2 Local Expenditures by Faculty and Staff

$$(E_L)_F = (E_H) = (E_{NH})_F$$

Derived: Local Expendisutres by Graduates

$$(E_L)_{Grad} = (E_H)_{Grad} + (E_{NH})_{Grad}$$

Model B-1.1.2.1 Expenditures by FAculty and Staff for Local Rental Housing

$$(E_H) = (f_L)\ (f_L)\ (DI_F)\ (e_H)$$

Dervived: Expenditures by Graduates for Local Housing

$$(E_H)_{Grad} = (g_L)\ (g_L)\ (DI_{Grad})\ (e_H)$$

These formulae were designed for determining faculty and staff expenditures. In the present study, the formulae are being applied to the expenditures of graduates inasmuch as their spending habits are considered more comparable to expenditures of faculty and staff as opposed to spending habits of students. In reference to housing, no attempt was made to distinguish whether subjects rented or owned their own homes since real estate taxes (payment to governments) were not being considered in this study.

Model B-1.1.2 Local Expenditures by Faculty and Staff

$$(E_L)_F = (E_H)_F + (E_{NH})_F + (E_L)_{NLF}$$

Derived: $$(E_L)_F = (E_H)_F + (E_{NH})_F$$

There are no non-local faculty in the Engineering Technology Division and therefore this factor was not used in computations.

Model B-1.1.2.1 Expendistures by Faculty and Staff for Local Housing

$$(E_H)_F = (f_L)\ (f_H)\ (DI_F)\ (e_H)$$

As originally set out by the American Council on Education study, this factor was defined as "rental" housing. As used in this study, the formula is applied to include all types of housing costs: owned or rented and real estate taxes are not considered as a factor.

Model B-1.1.2.2 Local Nonhousing Expenditures by Local Faculty and Staff

$$(E_{NH})_F = (f_L)\ (e_L)\ (DI_F)\ (e_{NH})_F$$

Appendix C of the American Council on Education report defines (e_L).

Model B-1.1.2.2 Local Nonhousing Expenditures by Local Faculty and Staff

$$(E_{NH}) = (f_L)\ (e_L)\ (DI_F)\ (e_{NH})_F$$

Derived: Local Nonhousing Expenditures by Local Graduates

$$(E_{NH}) = (g_L)\ (e_L)\ (DI_{Grad})\ (e_{NH})_{Grad}$$

Again (e_L) is defined in Appendix C, American Council on Education, 1971.

See page of this Appendix B.

CALCULATIONS

Model B-1.1.2.1 Expenditures by Graduates for Local Housing

$$(E_H) = (g_L)\,(g_H)\,(DI_{Grad})\,(e_H)$$

(g_L) = proportion ofgraduates residing locally

(g_H) = proportion of local graduates with housing costs

(DI_{Grad}) = total disposable income of graduates (ACE, 1971, p.34)

(e_H) = proportion of a person's total expenditures likely to be spent for housing (ACE, 1971,Appendix A)

Total N = 73 minus 3 out-of-state = 70

70 minus 11 of of the New Orleans SMSA = 59

59/73 = .0684

1 - .0684 = .9316 (proportion of graduates residing locally)

(g_L) = .9316 or .93

(g_H) = .93 (proportion of graduates with local housing expenses)

(DI_{Grad}) = Estimated gross median income for graduates was calculated to be $1,330,000. Disposable income is considered to be gross wages and salaries less 20 percent, or $1,064,000.

(e_H) = .32 (per ACE, 1971 calculations for Detroit)

= (.93) (.93)($1,064,000)(.32)

= (.8649) ($1,064,000)(.32)

= $920,253.6) (.32) = $294,481.15

CALCULATIONS continued...

Median income levels for the five parish area were computed as follows:

Income Level	Estimated Median Income	Number of Graduates	Total
Less than $10,000	$5,000	12	$60,000
10,000-14,999	12,500	6	75,000
15,000-15,999	15,500	4	62,000
16,000-19,999	18,000	6	108,000
20,000-29,999	25,000	20	500,000
30,000-39,000	35,000	6	210,000
40,000	45,000	7	315,000
		Total	$1,330,000
		Less 20%	266,000
			$1,064,000

ERIC Clearinghouse for Junior Colleges
DEC 15 1989